INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

www.ijabpt.com Volume-3, Issue-4, Oct-Dec-2012 Coden : IJABPT Copyrights@2012

ISSN : 0976-4550

Received: 11th June-2012 *Revised: 20th August-2012* *Accepted: 26th August -2012*

Research article

ASYMPTOMATIC BACTERIURIA IN DIABETIC WOMEN

Patil Nilima R*, Mali Ulhas S**, Ramtirthkar Meena N*** and Bhave (Sule) Poorva A****

*Department of Microbiology, Bharati Vidyapeeth, University Dental College & Hospital, Wanlesswadi Sangli.

**Department of Pathology, Bharati Vidyapeeth, University Dental College & Hospital, Wanlesswadi Sangli.

***Department of Microbiology, G.M.C.Miraj.

****Department of Microbiology, Rajiv Gandhi Med. College & Ch.Shivaji Maharaj Hosp. Thane (Mumbai)

E-mail- patilnilima@rocketmail.com, Mobile: - 9423023429, 9423268054

ABSTRACT:-Objectives:- To study the prevalence of ASB in diabetic women and to compare microbiological profile among diabetic and non- diabetic women. Material and methods:- In this prospective study, 100 midstream urine samples were collected from diabetic women without any signs and symptoms of urinary tract infection. Routine standard laboratory methods were used for isolation and identification of uropathogens. Antibiotic sensitivity test was done on MHA media by using Kirby Bauers disk diffusion method. Result: Prevalence of ASB was 13% in diabetic and 6% in non-diabetic women.E-coli found to be leading pathogen among diabetic and in non-diabetic women. Nitrofurantoin and Amikacin were found to be the most effective drugs against large types of bacteria.
Conclusion:- The initial choice of empirical antimicrobial therapy should be based on Gram stain and urine culture. Choice of antimicrobial therapy should integrate local sensitivity patterns of infecting organisms.

Key words- Asymptomatic bacteriuria (ASB), Prevalence, Diabetes mellitus (DM), *E-coli*, Uropathogens, Nitrofurantoin, Amikacin

INTRODUCTION

Diabetes mellitus is a complex metabolic syndrome caused by lack of insulin resulting in inappropriate high blood glucose levels (O'Sullivan DJ-1961). The incidence of diabetes mellitus (DM) throughout the world is increasing strikingly and is becoming a serious public health problem especially in the developing countries and many factors contribute to the emergence of diabetes in developing countries (Ribera MC -2006). India is considered to be the diabetic capital of world. Patients with DM have an increased risk of various infections, urinary tract being the most prevalent infection site (MacFarland et al – 1986). It has a long term effect on the incidence of UTI and it has been reported to be around four times higher in diabetics compared to non-diabetic patients (Adeyeba OA - 2007). Although the exact reasons for this trend remains unclear, a few studies have shown that the reason could be the presence of static pools of urine due to dysfunctional bladder contracting poorly, which serves as a favorable medium for bacterial growth while others suggest that hyperglycemic urine promotes rapid bacterial growth and colonization (Andriole VT - 2002). Hospitalization for Pyelonephritis occurs 15 times more frequently in diabetic patients.

Many UTIs are asymptomatic. The term asymptomatic bacteriuria (ASB) refers to the presence of positive culture in an asymptomatic person. A series of studies from 1959-2005 have provided evidence that UTI is distinctly more common among female diabetics compared to healthy females (Bonadio M. 2006). Hardings et al showed that women with DM and ASB had a much higher chances to develop pyelonephritis than those without ASB during three years follow up period.

The Aim of our study was to detect prevalence of ASB in diabetic women and to compare microbiological profile among diabetic and non diabetic women.

Coden : IJABPT Copyrights@2012 ISSN : 0976-4550

MATERIALS AND METHODS

A prospective study was performed on 100 known diabetic women aged 50-80 years. A randomly selected control group of 100 OPD women without diabetes was also evaluated in the same period.

Diagnosis of diabetes was made based on the WHO criteria (WHO-1999). The patients were studied on the basis of specific questionnaire.

Inclusion criteria considered were women in the age groups of 50-80 years with DM. Exclusion criteria were pregnancy, recent hospitalization, surgery, known urinary tract abnormalities, known symptomatic UTI or use of antibiotic drugs in last 14 days. All the patients were interviewed and their medical histories were obtained using a standardized questionnaire.

Midstream urine samples were collected from the patients after giving proper guidelines. The urine samples were immediately transported to the microbiology department and checked for contamination. If urine sample was found to be contaminated with normal flora of vagina and urethra the subject was asked to submit another sample for analysis.

Bacteriuria was defined as the presence of 10^5cfu/ml or more of one or two bacterial species in culture of clean voided midstream urine. A pure culture of Staph. aureus was consider to be significant regardless of colony count. The presence of yeast in any number was also considered to be significant (Betty A. 2002). Presence of three or more than three different microorganisms in a urine specimen was considered as contamination. All samples were processed for Gram staining, wet mount (pus cells) and cultured on blood agar and Mac-conkeys agar (Hi-media, Mumbai) by using standard nicrome wire loop. The plates were incubated at 37^oc aerobically for 24-48 hrs. Various standard biochemical tests were used for specification of bacteria. Preliminary biochemical tests were done like Catalase test, Oxydase test, Co-agulase test. Confirmatory tests were also done like, triple sugar iron agar test, Nitrate reduction test, Simmons citrate agar test, Christensens Urease agar test, indol test, Methyle red test, Voges- proskauer test and candida identification was done by germ tube test.

Antibiotic sensitivity test was done on MHA plate. Kirby Bauers disk diffusion method was used. Various drugs like Amoxicillin, Norfloxacin, Gentamycin, Nitrofurantoin, Ciprofloxacin, Piperacilin, Tobramycin and Co-trimoxazole were used in AST for uropathogens. AST was done according to NCCL guidelines.

RESULTS

Thirteen out of 100 diabetic patients (13%) enrolled in this study showed ASB while 6 out of 100 non-diabetic women (Control group) (6%) showed ASB (Table No.1). Six types of micro-organisms were isolated from urine cultures. *E-coli* was leading cause of ASB (59%) in diabetics, followed by *Klebsiella Spp* 10%, *Enterococcus faecalis* 10%, *Citrobacter Spp* 8%, *Coagulase negative staph* 7%, *Proteus Spp* 3%, *Candida albicance* 3% and so on as represented in the figure no1. In control group E-coli was found in 100% cases. Pyuria found in 84.6% 0f cases in DM patients and 66.67% in non-diabetic patients.

The sensitivity was performed against commonly used 8 antibiotics. Nitrofurantoin and Amikacin were found to be the most effective drugs against large types of bacteria. Lower sensitivity to Norfloxacin and Ciprofloxacin,while most of the bacteria showed resistance to piperacillin and Tobramycin.

Table No:-1 Age-wise distribution of diabetic women and % of diabetes

.

Age range	Patients	No of ASB patients	% of ASB patients
50-60	50	5	10.00%
61-70	30	4	13.33%
71-80	20	4	20.00%
Total :- 13%			

Coden : IJABPT Copyrights@2012 ISSN : 0976-4550

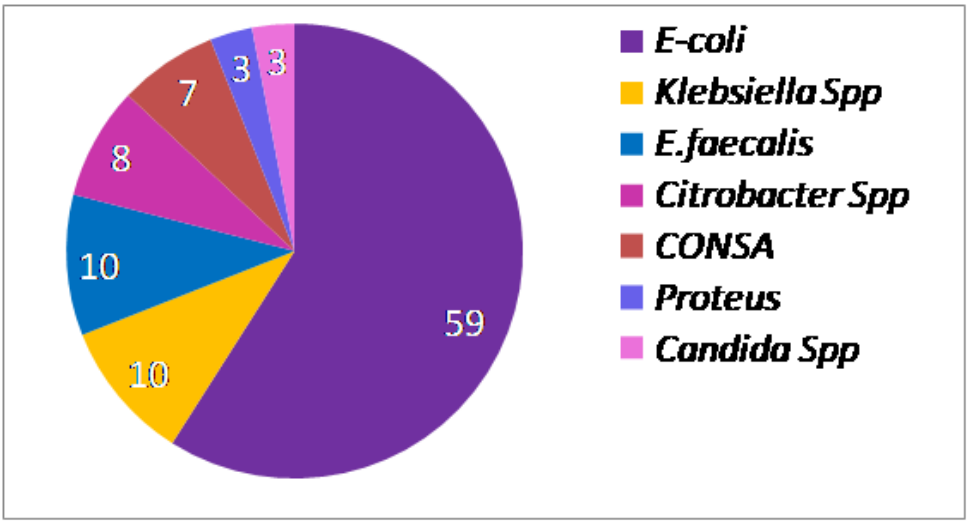

Fig 1. Percentage of organisms in asymptomatic diabetic women.

DISCUSSION

Diabetes mellitus (DM) is the most frequent endocrine disease. The prevalence and incidence of DM varies widely among different study populations. Diabetic patients are more prone to various types of infections. Majority of infections are located in the urinary tract (Carton JA -1992, MacFarlane IA1986). An autopsy study in 1940 showed that 18% of the patients with DM had a serious infection of the urinary tract (pyelonephritis) (Baldwin AD 1940).

ASB has also been reported to be commoner in women with diabetes. Many studies have also shown that bacteria in diabetic women involve the upper urinary tract more frequently (Zhanel et al 1995).

Many Indian studies show higher prevalence of ASB in women with DM than in women without DM (Bhushan and Tiwari 2001, G Sibi et al 2011). Our findings also correlate with above studies. In our study out of 100 diabetic women, 13% had ASB while it was 6% in non-diabetic elderly women. This prevalence of ASB in diabetic patients is higher than other studies (Lawrence – 2003,Jha BK – 2009). The high prevalence of ASB among women may be because of absence of normal residential flora of vagina, due to less acidic PH in postmenopausal woman, almost all the female participants included in this study were postmenopausal women. The other reason could be uncontrolled blood sugar level (Collee JG-1989). It could also be because of differences in host response in diabetic and non-diabetic patients.

Various risk factors for ASB in diabetic women have been suggested, including age & duration of diabetes (Osterby 1964). In this study prevalence of ASB in diabetic women has increased with increasing age.

Our results found that there is significant relationship between ASB and Pyuria, and the result correlate with Geerlings -2000 and Geerlings – 2001.

In our study duration of DM can be considered as an associate for ASB. Some other studies have also shown that the longer duration of diabetes increases the risk of developing ASB (Osterby Hansen R : 1964) , while others could not confirm this notion (Storm 1987, Schmitt JK 1986).

The result of this study showed *E-coli* (59%) to be the most prevalent organism in ASB among diabetic women and (100%) also in non diabetic women. This was higher than that reported by Geerlings in 2000, Mendoza in 2002. In our study, 5% diabetic women had candiduria. Shukla I .et al found increasing prevalence of asymptomatic candiduria may be due to suppressed immunity among diabetic patients (Shukla I. et al-2004).

Drug resistance, now a day, is the biggest emerging problem in the microbial world. Various studies showed resistance of uropathogens to Ampicillin and Co-trimoxazole at various places (Geerlings B 2003). In our study Nitrofurantoin and Amikacin were most effective drugs & our result correlates with Jha BK- 2009.

Coden : IJABPT Copyrights@2012 ISSN : 0976-4550

CONCLUSION

Despite the clinical significance of UTI in diabetes it is inadequately understood and management regimens are mostly not evidence based. Anticipation of potential complications and earlier interventions are vital to reduce serious adverse outcomes.

The initial choice of empirical antimicrobial therapy should be based on Gram stain and urine culture. Choice of antimicrobial therapy should integrate local sensitivity patterns of infecting organisms.

Treatment of ASB in patients with diabetes is often recommended to prevent the risk of symptomatic UTI. However management of ASB in patients with DM is complex with no single preferred approach.

No confirmation is available on the best possible treatment of acute cystitis and pyelonephritis in patients with DM. Thus we suggest that screening of UTI in DM patients is imperative.

REFERENCES

Adeyeba OA,et al.(2007), Bacterial Urinary tract infections in patients with Diabetes Mellitus. International Tropical Journal of Medicine 2:89-92.

Andriole VT.(2002) Asymptomatic bacteruria in patients with diabetes, enemy of Innocent visitor? N. Eng. J. Med.347:1617-1618.

Baldwin AD et al (1940). Infections of the upper urinary tract in the diabetic patient. New Engl. J. Med. 223(7):244–250.

Betty A. Forbes et al (2002). Bailey and Scotts Diagnostic Microbiology. 11 th ed.. p. 936-7.

Bhushan, R and S.C. Tiwari (2001) Urinary tract infection – A suitable approach. J.Ind. Acad. Clin. Med., 2:331-337. the diabetic patien.

Bonadio M.(2006), The influence of diabetes mellitus on the spectrum of uropathogens and the antimicrobial resistance in elderly adult patients with urinary tract infection, BMC Infect Dis. March 17. doi: 10.1186/1471-2334-6-54.

Carton JA, et al (1992), Diabetes mellitus and bacteraemia: a comparative study between diabetic and non-diabetic patients. Eur. J. Med. 1:281–287.

Collee JG, et al (1989), Laboratory strategy in the diagnosis of infective syndrome. In: J. G. Collee, A.G. Fraser, B. P. Marmion, A. Simons, Mackie & Mc cartney, editors. Practical Medical microbiology. Vol. (1).13 th ed.London: Churchill Livingstone; 84-90.

G Sibi et al (2011), Prevalence, microbiological profile of urinary tract infection and its treatment with trimethoprim in diabetic patients Research Journal of Microbiology 6 (6):543-551,

Geerlings SE et al, (2000), Asymptomatic bacteriuria may be considered a complication in women with diabetes.The Diabetes Mellitus Women Asymptomatic Bacteriuria Utrecht Study Group:Diabetes Care 23:744–749

Geerlings SE, et al, (2001), Urinary tract infection in women with diabetes mellitus. Ned Tijdschr Geneeskd.145:1832–1836

Geerlings B, et al, (2003), ASB in diabetic women diabetes care. 26 (7): 2209-10.

Jha BK et al,(2009), Prevalence of asymptomatic bacteriuria among elderly diabetic patients residing in Chitwan Kathmandu University Medical Journal Vol. 7, No. 2, Issue 26, 157-161.

King H et al (1993), Reiwers M. Performance Standardized for Antimicrobial Disk Susceptibility Testing, 5th Edn. approved Standard NCCLS Document M2-A5. Villanova Pa:NCLLS

Lawrence A et al (2003), Management of ASB in diabetic patients. Drug information round. Asian J Diabet. 5 (1): 8-10.

MacFarlane I et al (1986), Bacteraemia. Diabetics J. Infect.12:213–219.

Mendoza T et al (2002) Asymptomatic bacteriuria in type 2

diabetic women. Rev Med chil 130: 1001-1007 (Article in Spanish)

O'Sullivan DJ et al (1961), Urinary tract infection: A comparative study in the diabetic and general populations. Br Med J; 1:786-788.

Coden : IJABPT Copyrights@2012 ISSN : 0976-4550

Osterby Hansen R (1964): Bacteriuria in diabetic and non- diabetic out- patients. Acta Med Scand 176:721-730.

Ribera MC et al (2006 June), Incidence and risk factors associated with urinary tract infection in diabetic patients with and without asymptomatic bacteriuria. Eur J Clin Mic Inf Dis 25(6):389-393.

Schmitt JK et al (1986) :Asymptomatic bacteriuria and hemoglobin Al. Diabetes Care 9:518-520.

Shukla I et al (2004), Prevalence of _-Lactamase & ESBL producing microbes. IJMM. 22 (2): 51-87.

Storm BL, et al, (1987) sexual activity , contraceptive use and other risk factor for symptomatic and asymptomatic bacteriuria: a case-control study , Ann Intern Med,107:816-23.

World Health Organization: Definition, Diagnosis and Classification of diabetes mellitus and its complications; Part 1: Diagnosis and Classification of diabetes mellitus, Geneva. Department of non communicable Disease Surveillance. WHO; 1999.

Zhanel GG et al (1995), Diabetic urinary infection study Group: Prevalence of asymptomatic bacteriuria and associated host factors in women with diabetes mellitus. Clin Infect Dis. 21; 316-322..